

Appl. No. 09/482,023
Amdt. dated Sept. 25, 2003
Supplemental Reply to Final Office Action of April 28, 2003
And Advisory Action Dated August 25, 2003

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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1 - 9 (Cancelled)

10. (Previously presented) A quench gasifier for gasifying ash-containing hydrocarbon feedstocks, comprising:

a combustion chamber for partially oxidizing carbon in the feedstocks to produce synthesis gases; and

a quench chamber adjacent to said combustion chamber, said combustion chamber including a throat adjacent to said quench chamber for directing said gases from said combustion chamber to said quench chamber, characterized in that said throat includes:

an inlet adjacent to said combustion chamber, said inlet having an inlet diameter;

an outlet adjacent to said quench chamber, said outlet having an outlet diameter;

an inner surface and outer surface between said inlet and said outlet;

an electrical heating element between said inner and outer surfaces; and

wherein said inlet diameter is greater than said outlet diameter.

11 - 14 (Cancelled)

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15. (Previously Presented) The quench gasifier according to claim 10 wherein said inner surface comprises a wind tunnel profile.

16. (Cancelled)

17. (Previously Presented) The quench gasifier according to claim 10 wherein the ratio of said inlet diameter to said outlet diameter is at least 3.

18. (Previously Presented) The quench gasifier according to claim 17 wherein said ratio is in the range from 3 to 67.

19. (Previously Presented) The quench gasifier according to claim 10 wherein said quench chamber comprises a quench ring substantially axially adjacent to said throat outlet, such that the quench gasifier does not include a plenum chamber.

20. (Previously Presented) The quench gasifier according to claim 19 wherein said quench ring has an inner diameter that is greater than the diameter of said throat outlet, ~~said quench ring inner diameter being sufficiently large to substantially prevent damage to said quench ring.~~

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21. (Cancelled)
22. (Withdrawn) A method for gasifying ash-containing hydrocarbon feedstocks comprising:
partially oxidizing the feedstock by mixing a feed stream, the feed stream comprising an oxidant, said feedstock, and a temperature moderator, in a combustion chamber comprising a reaction zone under conditions sufficient to produce synthesis gases with a predetermined carbon conversion rate, said conditions including a temperature of about 2000 – 3000°F; and
electrically heating a portion of the combustion chamber to a temperature elevated above 3000 °F.
23. (Withdrawn) The method of claim 22 wherein said oxidant is oxygen and wherein the synthesis gas production is increased without increasing the consumption of the oxygen.
24. (Withdrawn) The method of claim 22 wherein the synthesis gas production is increased without increasing the consumption of the feedstock.
25. (Withdrawn) The method of claim 22 wherein the temperature moderator is steam.
26. (Withdrawn) The method of claim 22 wherein the temperature moderator is carbon dioxide.
27. (Withdrawn) The method of claim 22 wherein the electrical heating comprises exposing said chamber portion to electromagnetic radiation.

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28. (Withdrawn) The method of claim 22 wherein the electrical heating comprises applying electrical current to a resistor that is adjacent to said chamber portion.

29. (Withdrawn) The method of claim 22 wherein said portion includes substantially the entire hot face of the combustion chamber, such that the feed stream is preheated electrically, eliminating the use of a preheat burner.

30. (Cancelled)

31. (Previously Presented) The quench gasifier according to claim 10 wherein said heating element extends from said outlet to said inlet.

32. (Previously Presented) The quench gasifier according to claim 31 wherein said heating element is a spirally wound member having a first diameter near said throat inlet and a second diameter near said throat outlet, and wherein said first diameter is greater than said second diameter.

33. (Cancelled)

34. (Previously Presented) A quench gasifier for gasifying hydrocarbon feedstocks, comprising:

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a combustion chamber for partially oxidizing the carbon in the feedstocks to produce synthesis gases and slag;

a quench chamber adjacent to said combustion chamber, said quench chamber having a gas outlet for directing said gases away from said quench chamber; and

wherein said combustion chamber includes a throat for directing said gases and said slag from said combustion chamber to said quench chamber, said throat comprising:

an inlet;

an outlet;

an outer surface between said inlet and said outlet;

an inner surface between said inlet and said outlet;

a heating element between said inner and outer surfaces; and

wherein said inner surface has a curved, conical contour.

35. (Previously Presented) The quench gasifier according to claim 34 wherein said heating element is near said inner surface such that said heating element substantially follows said curved, conical contour of said inner surface.

36. (Cancelled)

37. (New) A quench gasifier for gasifying ash-containing hydrocarbon feedstocks, comprising:

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a combustion chamber for partially oxidizing carbon in the feedstocks to produce synthesis gases; and

a quench chamber adjacent to said combustion chamber, said combustion chamber including a throat adjacent to said quench chamber for directing said gases from said combustion chamber to said quench chamber, characterized in that said throat includes:

an inlet adjacent to said combustion chamber, said inlet having an inlet diameter;

an outlet adjacent to said quench chamber, said outlet having an outlet diameter;

an inner surface and outer surface between said inlet and said outlet; and

an electrical heating element between said inner and outer surfaces wherein said heating element is configured to maintain said inner surface at a temperature of at least 3000°F.

38. (New) The quench gasifier according to claim 37 wherein the feedstocks include metal compounds such as vanadium trioxide, and wherein the feedstocks are substantially free of solidified metal compounds.

39. (New) The quench gasifier according to claim 37 wherein said heated inner surface causes the partially oxidized carbon in the feedstocks to increase in the range of 0.1 to 3.0 percent.

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40. (New) The quench gasifier according to claim 37 wherein said heated inner surface causes a steam consumption rate in the range of 0.15 to 0.25 pounds of steam per pound of feedstocks.